data interchange for geotechnical and geoenvironmental specialists

The DIGGS Standard and Piling

(v1)

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Representation and Standardisation
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Disclaimer: The examples and schema are preliminary and the final version will be available when the official version is released.

Need for Collaboration

- US is behind in standardization efforts
- UK through AGS has rich organization, experience and a well developed standard
- Collaboration can open markets
- International standard can improve practices and software
- New standards can improve products

- Future goal is asset management systems

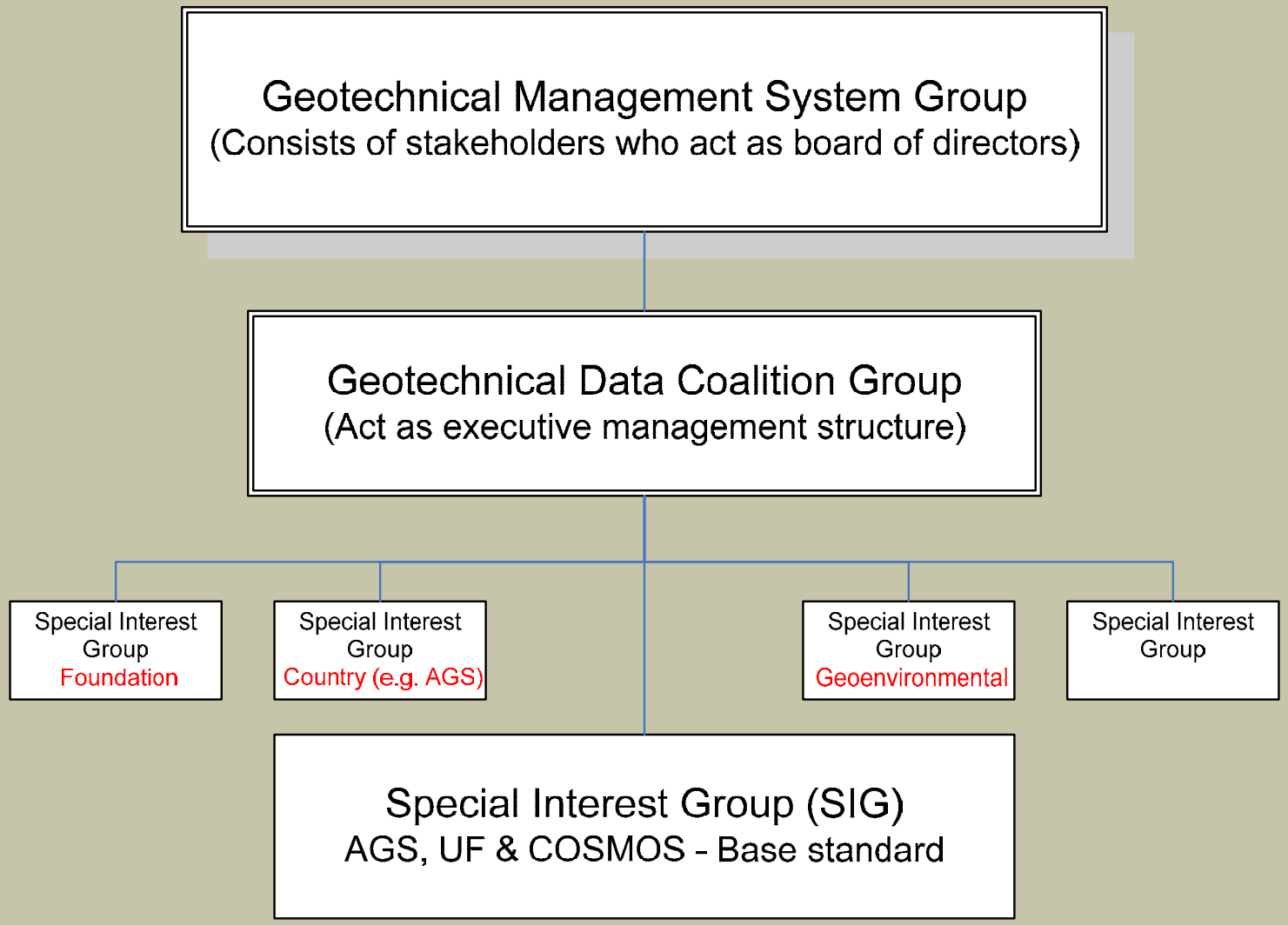
Benefits of Data Standards

- Means for information sharing
  - single entry of data
  - reusable data
  - QA/QC – allows for software verification
  - More accurate bids (using existing data)
- Saves money, time and energy in system development
- Assists software makers in the development of programs that fit within the framework
- Allows for unified asset management and assessment

USA Pooled Fund Project TPF-5(111)

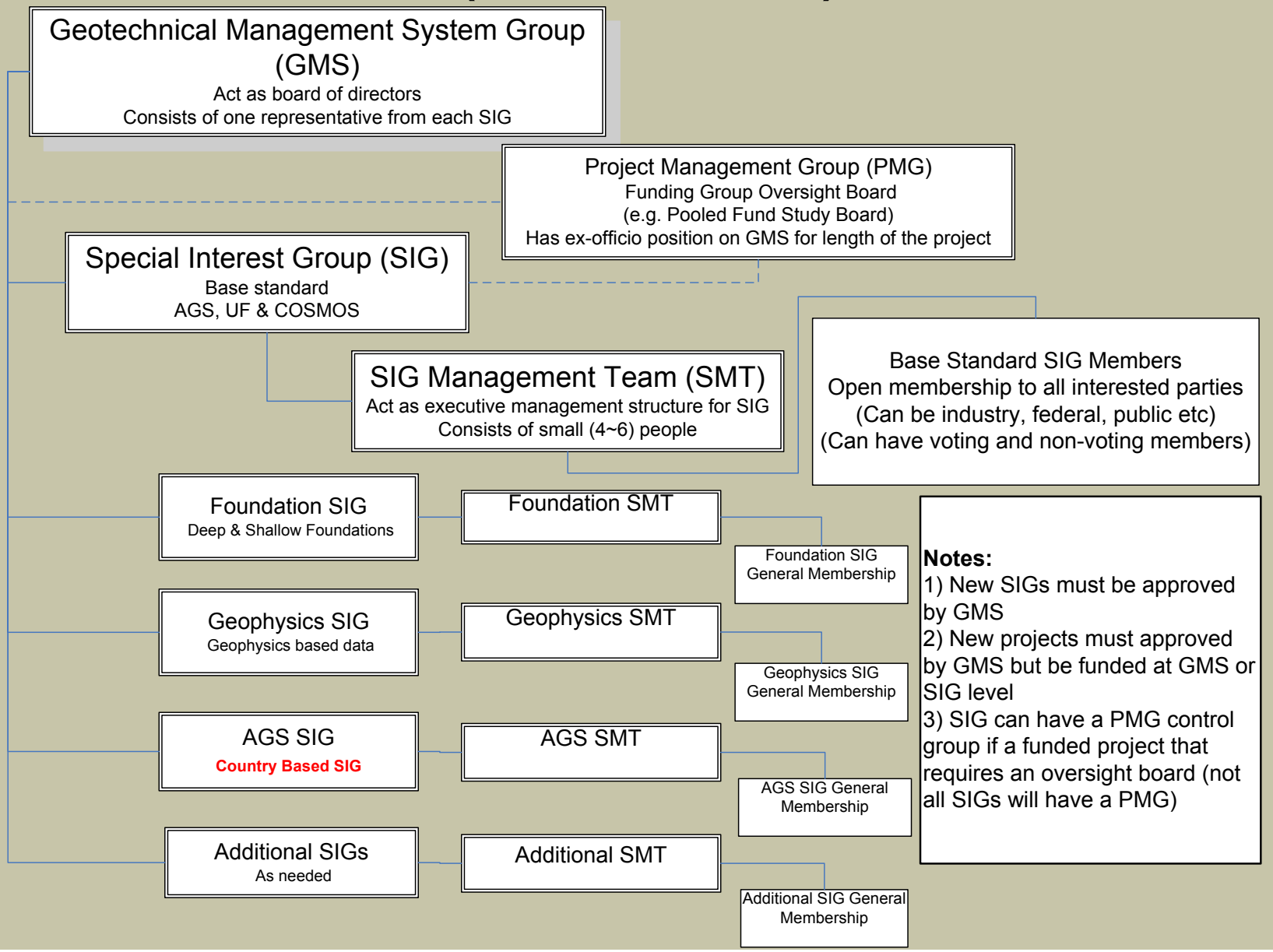
- $643,000 in funding
- Combine existing geotechnical data standards (AGS, UF, COSMOS)
- Expand to include other data (i.e. geo-environmental, geohazards, slopes, drainage)
- Develop international organization to manage and enhance standard

Pooled Fund Organization



Possible DIGGS Management Structure

(Under Discussion)



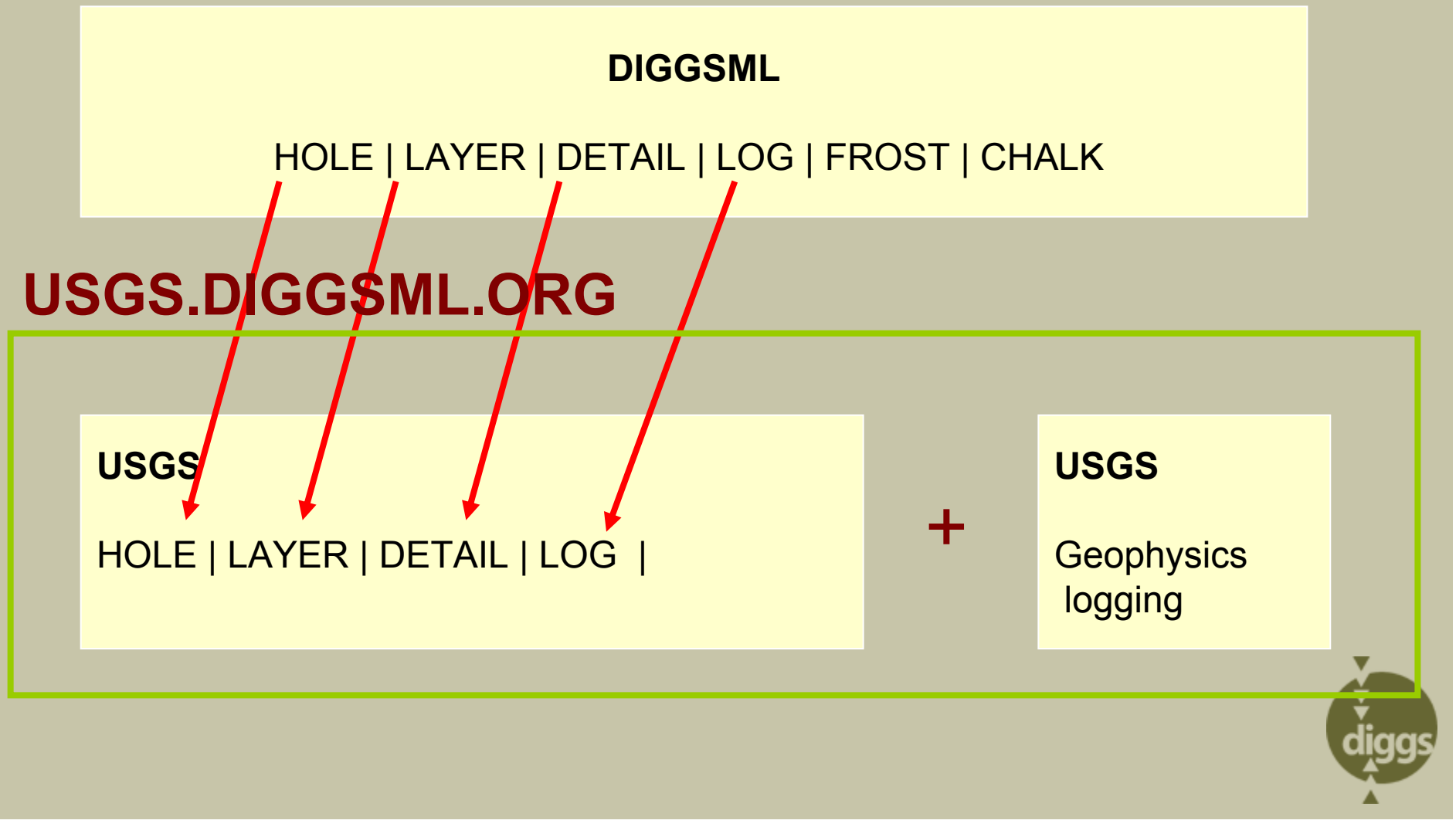
Project Timeline

- May 2005 – Pre-planning meeting
  - Agreement on skeleton structure and path forward
- August 2005 – Schema and Dictionary draft development
  - Base Draft developed
- November 2005 – Finalize Dictionary
  - Complete dictionary merger
- January 31, 2006 – Draft Dictionary and Schema
  - Distribute drafts for comment to management team
- May 15, 2006 – Internal Review of Draft
  - Perform an internal review of the proposed draft
- August 4, 2006 –Distribution of draft for limited review
  - Distribute for detailed review of dictionary, schema, guides
  - Comments returned by Sept 15
- November 1, 2006 – Distribution of full public review
- February 1, 2007 - Finalized version 1.0 of schema released

DIGGSML Benefits

- GML compliant
- Enumerated Lists (Codelists)
  - Defined values for elements (e.g. classification)
- Attached Files
  - Point to any type of file
- Units
  - POSC pre-defined (oil industry)
- Dictionaries
  - Authoritative definitions and schema on website
- Allows local extensions and profiles

Example Organization Based Profile



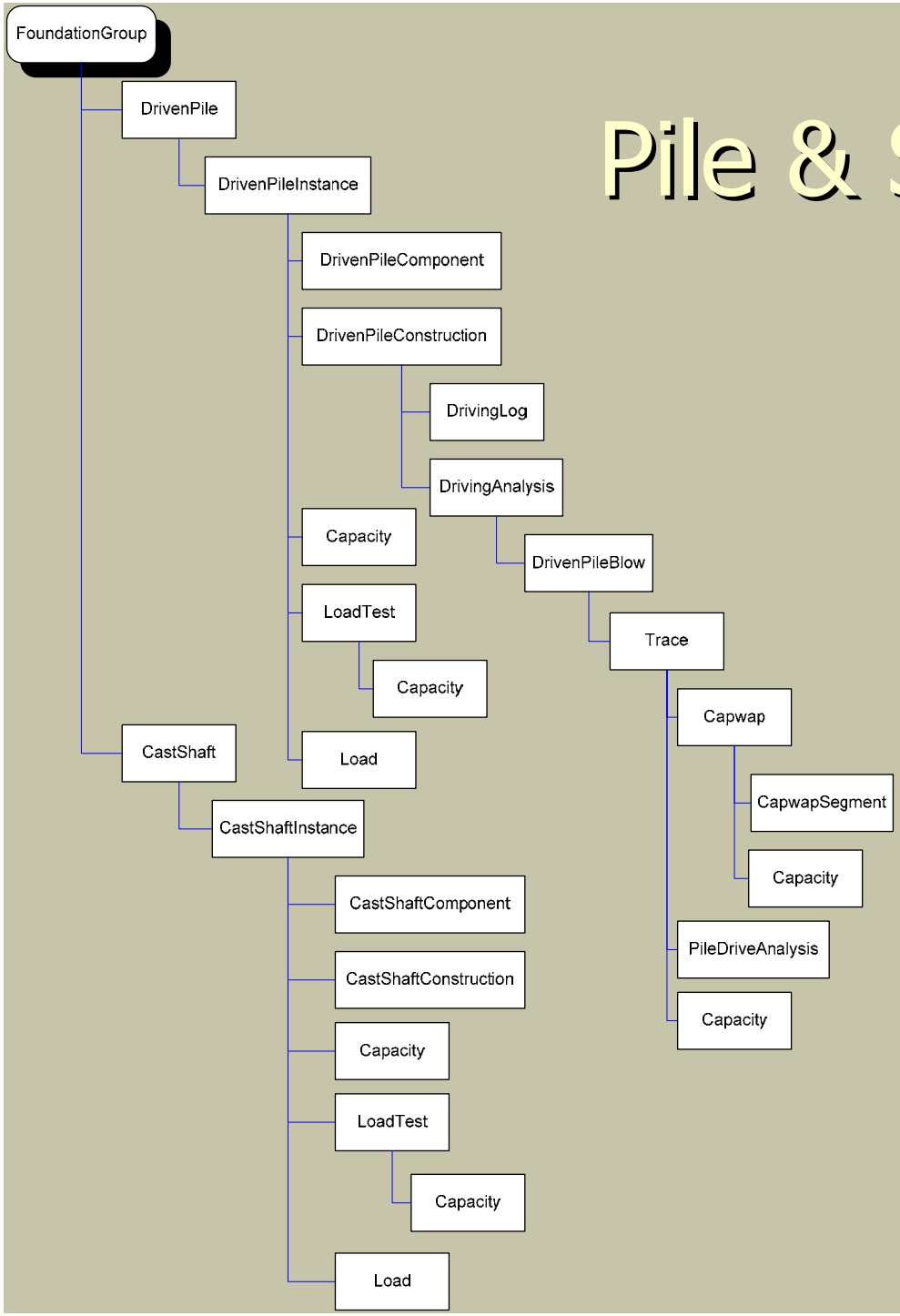
Generic Draft Schema Structure

- Transmission Information
- Project
  - Location, date, etc
  - Excavation (future)
    - Face
      - Sample
        - Specimen
    - Layer
    - In-Situ Tests
  - Hole
    - Hole Parameters (dia, casing, etc)
    - Layer Information
    - Sample (type = core, etc.)
      - Specimen
        - Lab Tests
    - In-Situ Tests
      - SPT, CPT, Dilatometer
    - Monitoring Point
      - Monitoring Data
  - Surface Line (future)
    - Line
  - Foundation
    - Pile
      - Construction
        - Driving
      - Capacity
      - Section Information
      - Load Tests
    - Shaft
  - Geophysics
    - Well Logging
- Business Associate
- Equipment
- Dictionaries

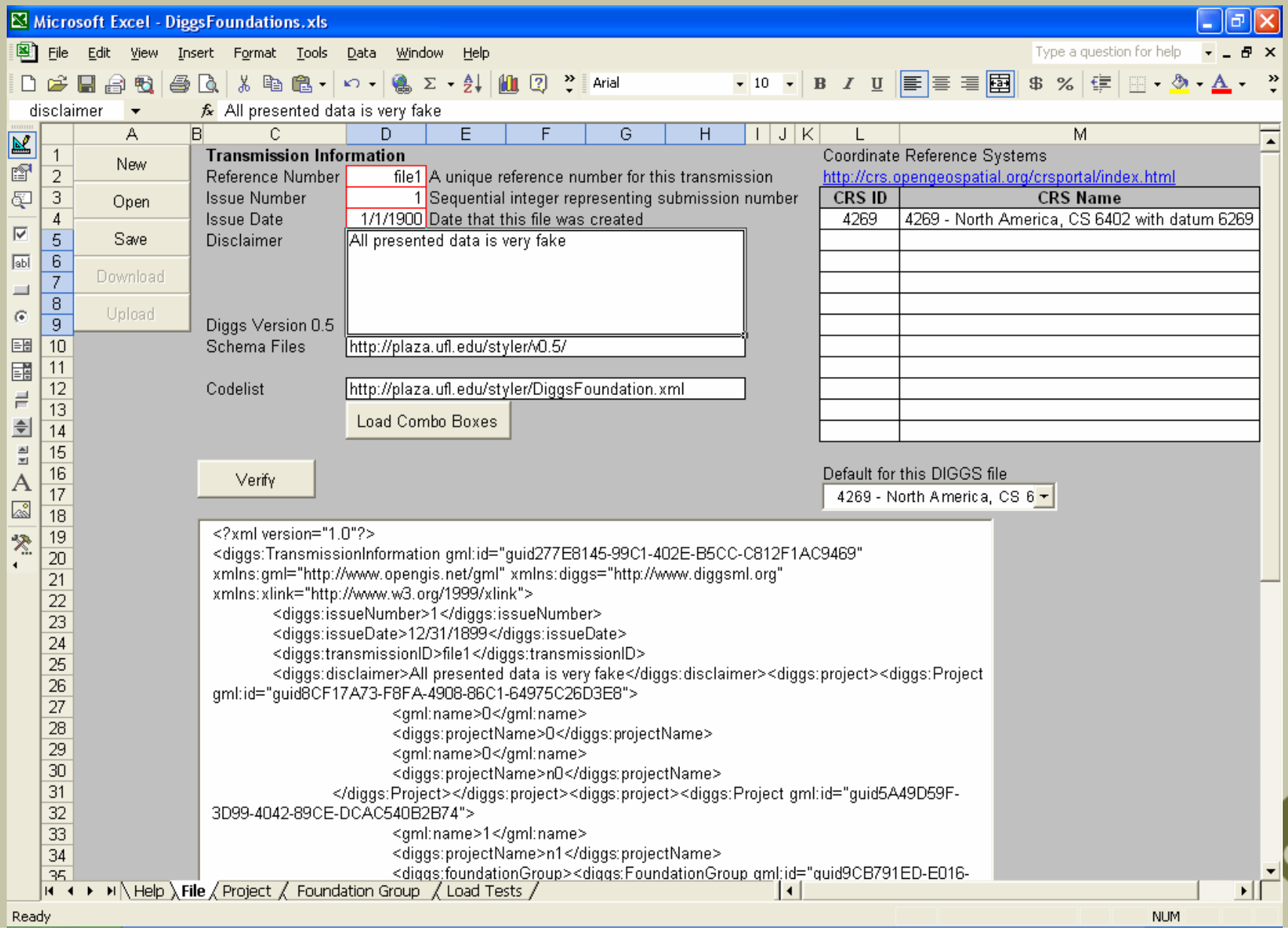
Piled Foundations

- Handles driven piles and cast shafts
- Multiple Instances of each
  - Design, constructed, tested, damaged, etc
- Contains cross section information
  - Shape, steel (pre-stressed and mild)
- Handles test data
  - Axial, lateral, dynamic, etc

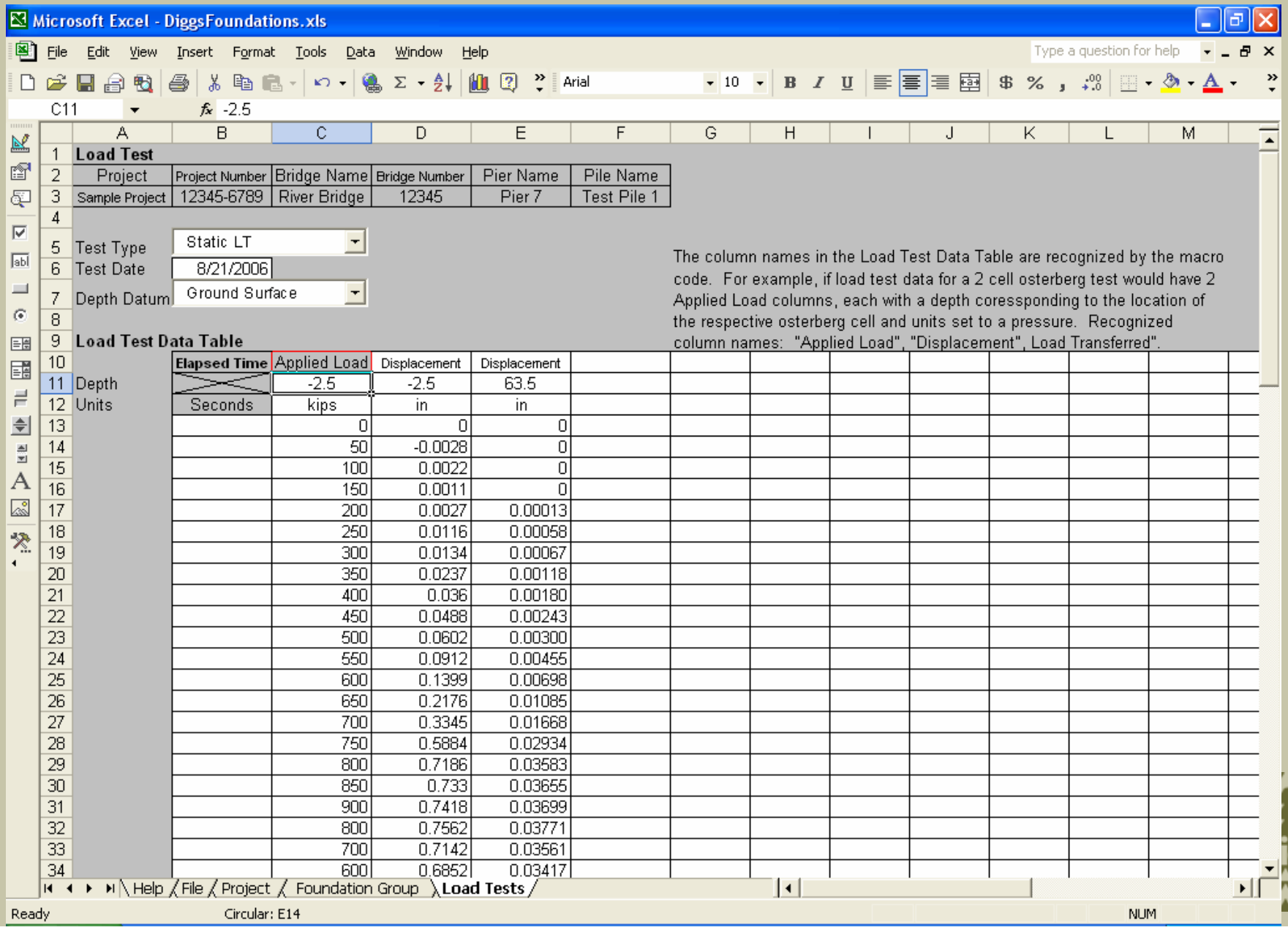
Pile & Shaft Hierarchy



Excel Example using VBA



Pile Static Load Test Data



Load Test

Project	Project Number	Bridge Name	Bridge Number	Pier Name	Pile Name
Sample Project	12345-6789	River Bridge	12345	Pier 7	Test Pile 1

Test Type: Static LT
Test Date: 8/21/2006
Depth Datum: Ground Surface

The column names in the Load Test Data Table are recognized by the macro code. For example, if load test data for a 2 cell osterberg test would have 2 Applied Load columns, each with a depth coressponding to the location of the respective osterberg cell and units set to a pressure. Recognized column names: "Applied Load", "Displacement", Load Transferred".

Load Test Data Table

	Elapsed Time	Applied Load	Displacement	Displacement
Depth		-2.5	-2.5	63.5
Units	Seconds	kips	in	in
		0	0	0
		50	-0.0028	0
		100	0.0022	0
		150	0.0011	0
		200	0.0027	0.00013
		250	0.0116	0.00058
		300	0.0134	0.00067
		350	0.0237	0.00118
		400	0.036	0.00180
		450	0.0488	0.00243
		500	0.0602	0.00300
		550	0.0912	0.00455
		600	0.1399	0.00698
		650	0.2176	0.01085
		700	0.3345	0.01668
		750	0.5884	0.02934
		800	0.7186	0.03583
		850	0.733	0.03655
		900	0.7418	0.03699
		800	0.7562	0.03771
		700	0.7142	0.03561
		600	0.6852	0.03417

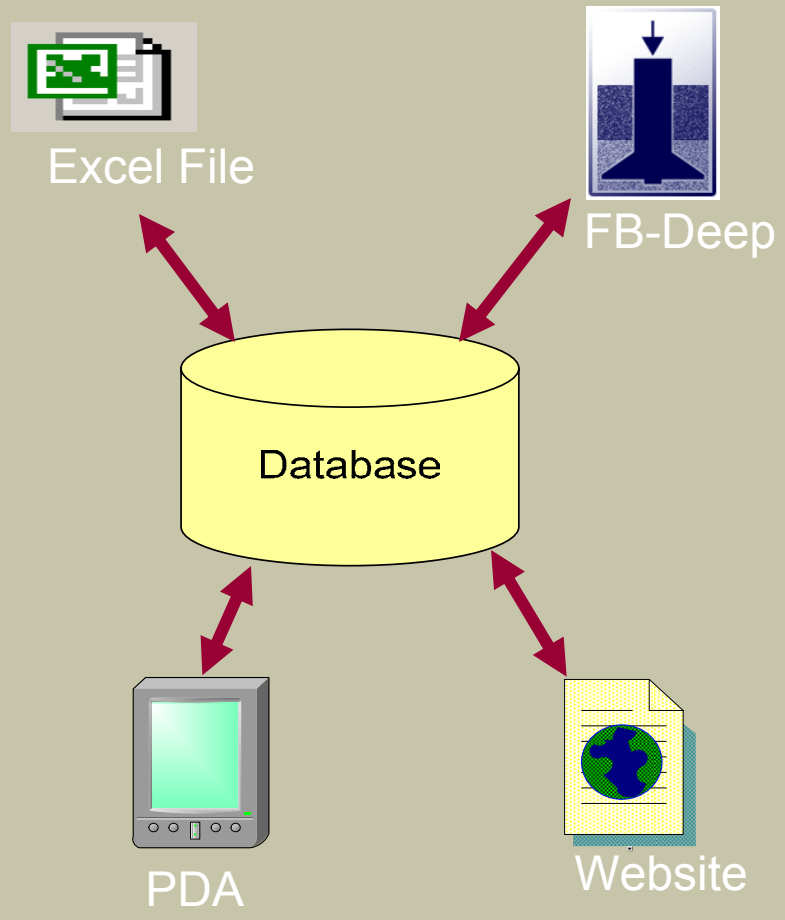
Data Types

- There exist 4 types of data
  1. Metadata about the test (date, time, location)
  2. Parameters derived from the test
  3. Raw from the test form which the parameters can be derived
  4. Calibration data

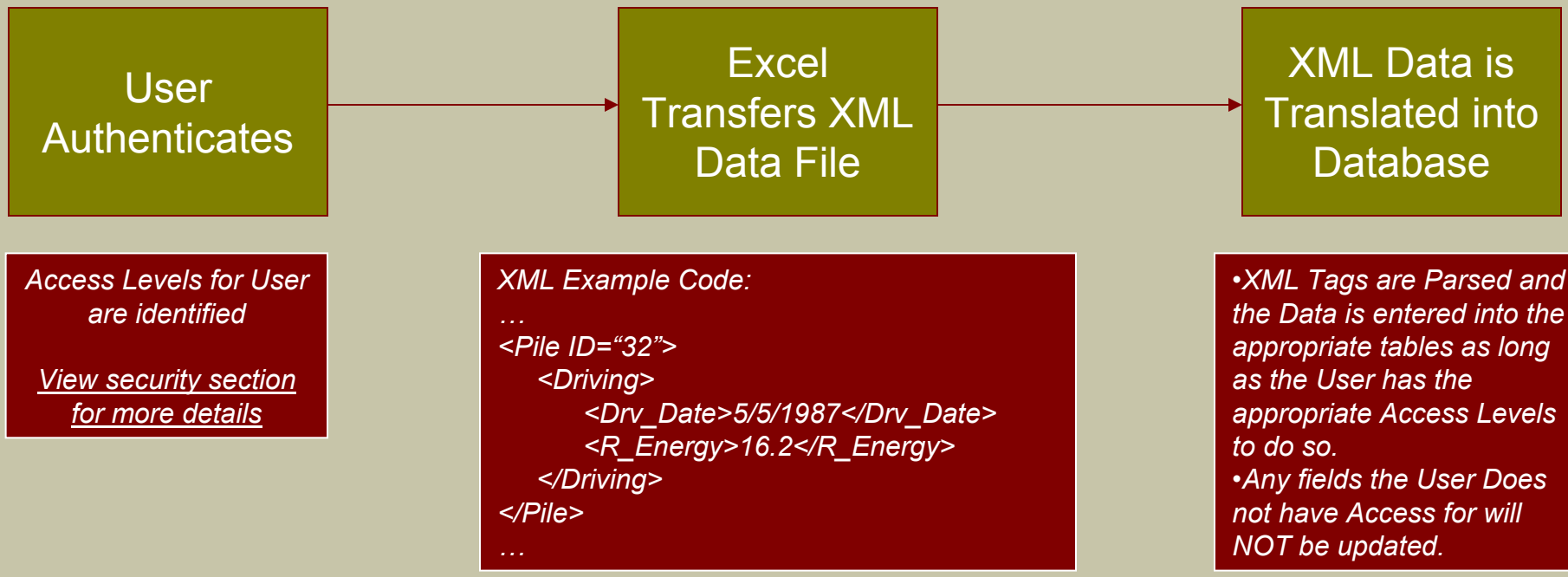
- The DIGGS transfer standard only includes 1) and 2) for most information

Florida Database Implementation

- FDOT funded the development of an XML based database
- Data restricted by user security
- Upload and retrieve through XML file
  - Web App controls conversion to DB format
  - DB format is not seen by users or applications
- Application centric – general access
- Browser access to view, update or retrieve in Excel
- Data controlled by designated users
  - Add users, create projects and data
- FDOT contract to implement DIGGS for 06-07

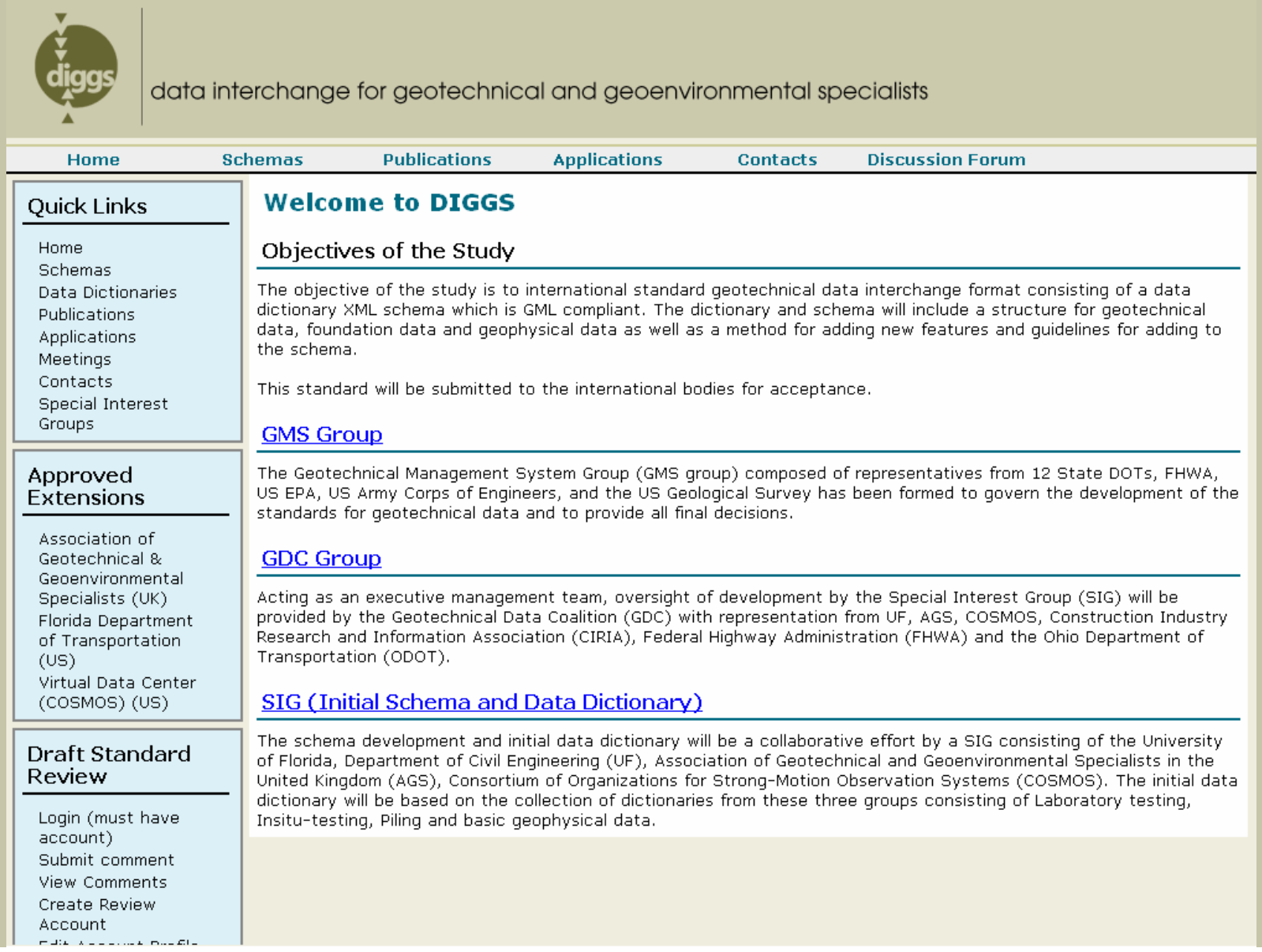


Extract or Submit any data fragment



Only data for which the user has security is available

Website with Namespace Documents
http://DIGGSml.org



Conclusion

- DIGGS is an extensible standard
  - Organization and structure set up for inclusion of other standards
  - Allows for quick updates and customizations with a process for permanent inclusion
- International cooperation essential
- Base standard provides strong foundation for collaborative efforts